Incidental Advantages.

A system such as that indicated would have some incidental advantages. It would provide a persistent and calculable system of ventilation that would enable hot water or steam pipes to be used advantageously much more generally than they can be at present, and afford other facilities corresponding to those of an efficient system of drainage with a copious water supply.

Contribution of Local Authorities to the Solution of the Problem.

Hitherto the powers of local authorities have been restricted to fining conspicuous offenders, and the system of penalties for conspicuous failure is not fully effective; it might be replaced advantageously by a system of rewards for success. For the sake of definiteness, I have set down the contribution of the local authority as equivalent to a tenpenny rate, though it would not seem practicable for it to contribute in the same way as it does to the solution of the sewage question by maintaining a single municipal system. It might contribute effectively by allowing a specific *reduction of rate* on those properties within its area which were so arranged as not to add to the pollution of the atmosphere by smoke.

If the questions which I have mentioned are to be asked, it is essential that they should be put in such a manner that practical men of science may be encouraged to work out effective answers, and for that purpose they must make experiments. In the practical applications of science on the large scale, experiments are very expensive, and the only way of getting them performed is to take care that they are remunerative to somebody if successful. In this matter the local authorities could be of great assistance if they were willing to adjust their rating in what seems to me a reasonable manner. At present the incidence of rating is such as to discourage all experiments of this kind. If an enterprising architect were to erect a block of buildings and provide it with means of delivering its used air free of smoke at a substantial outlay, I presume the local authority would increase the rateable value of the property on account of the outlay, and thus fine the owner some considerable sum per annum for his enterprise. The owner would also be placed in the unfortunate position that whereas by avoiding smoke he had conferred as much benefit upon all his neighbours as upon himself, he would have to pay the whole fine of increased ratal himself, and would still have all the disadvantages of his neighbours' smoke.

I would suggest that instead of pursuing so unreasonable a course, the local authorities might recognise public spirit of this kind by reducing the assessment of a property that, to the satisfaction of its neighbours as well as of a surveyor or inspector, produced no smoke, so that the rates upon such a property should be decreased by, say, 6*d.* or 1*s.* in the pound instead of being increased. This would afford direct encouragement to practical men of science to design and keep in action means for the prevention of smoke, and would lead to gradual improvement.

It would naturally appeal with the greatest force in those quarters where rateable value is high and the advantage of open fires relatively small, and in such places it would be really worth while for practical men to make a serious effort to qualify for the reduction of rate. In the City of London, for example, there must be many properties with very high rateable value the facilities of which for contributing smoky air are already limited to one hot-water furnace and a few open fires. For such establishments it would be an experiment on a very small scale to arrange matters to obviate smoke altogether and satisfy the surveyor or inspector that the property was smokeless, and thus secure the reduction of rate. There might be some difficulty at first in establishing a qualification, but it could not be greater than the difficulty of establishing a right to a parliamentary vote. In the course of time, the smoke producers would be a few exceptional persons paying exceptionally high rates, a very rational state of affairs; and when the City of London had by the gradual extension of such experiments freed itself from its own smoke, I think we might safely rely upon the citizens to take care that the indirect economies to which they would be legitimately entitled by their public spirit were not destroyed by the unrestricted smoke production of the surrounding boroughs.

I have made the system of the general collection of smoke by mechanical means for the purpose of treatment the basis of my remarks, but I have already disclaimed any desire for exclusive privileges for that particular form of experiment in the purification of smoky air. If it be feasible on the commercial scale, it has the advantage in an especial manner of making successive improvements possible. The smoky air of London is injurious, not only on account of its visible soot, but also on account of the sulphurous acid and other invisible products of combustion which accompany the soot in the first instance. If it be found possible in the first place to deposit the soot particles, attention might next be turned to some means of dealing with the noxious acid fumes, at least, in those cases where they are specially abundant.

Such a system would thus be, in the first instance, a direct encouragement to progressive experiments, and in the end would enlist the active support of all those possessing arrangements for avoiding smoke in favour of effective compulsion for those who had not.

To put the questions I have indicated to men of science in this way would be merely a matter of business, and if the questions were so put, the science of the twentieth century would probably give as satisfactory an answer to the question of the treatment of smoke as the science of the nineteenth has given to the question of the treatment of sewage.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—The Hon. C. A. Parsons, M.A., F.R.S., whose scientific work in connection with the development of the steam turbine has excited much interest, has been elected to an honorary fellowship at St. John's College, of which he was formerly a scholar.

Mr. L. Doncaster, King's, has been appointed to work at the University table in the Naples Zoological Station.

A conference on the training of teachers for secondary schools for boys will take place in Cambridge, under the presidency of the Vice-chancellor, in November.

The Gedge prize for research in physiology has been awarded to Mr. S. W. Cole, King's.

ON Wednesday, October 22, Mr. Andrew Carnegie was formally installed to the rectorship of St. Andrew's University. In his rectorial address, Mr. Carnegie dealt with the economic changes in the relative position and power of nations which either have taken place or are impending. Among honorary degrees conferred on the occasion was one bestowed on Mr. Alexander Graham Bell, the inventor of the telephone.

WHILE agricultural education is in a flourishing condition in the colleges of the United States, it is not yet doing as much for the welfare of the American farmer as is desirable. This, at least, we infer from the vigorous address delivered by the Secretary of Agriculture before the National Educational Association, which is briefly referred to in an editorial article in vol. xiv. part i. of the "U.S. Experiment Station Record." Mr. Wilson pleads not so much for technical instruction in agriculture as for the *education* of "half the people under our flag, who till the soil and furnish 65 per cent. of our exports." The importance of this class warrants the special adaptation of the educational system to its needs. "The four-year college course does not begin soon enough nor continue long enough to meet the requirements of our day." Study should begin in the primary school and continue through life. Teachers and the organisers of education in rural districts should understand the farmer's requirements, should themselves know something of agricultural science, and to this end Mr. Wilson recommends that teachers in primary and secondary schools should be sent to agricultural colleges at State expense to get the necessary knowledge. While much might be done to awaken the interest of the rising generation in agriculture were the teachers in elementary schools possessed of an agricultural bias, it is doubtful if any such "entirely new" system as Mr. Wilson refers to in the following sentence would be practicable or desirable. "Five thousand students attend agricultural colleges, but these colleges are feeling their way in the dark along untravelled paths. . . They will at last forge out a system that will meet the requirements of producers and be entirely new and suitable to our conditions as a people."

IN the *North British Agriculturist* of October 22, a different and more direct method of awakening the interest of the young farmer in his work is described. Under the auspices of the

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Berkeley Hunt Society, a competitive examination in agriculture, and especially in the arts of hedging, thatching, judging stock, &c., is held. The examination is open to young farmers and labourers of the district, is partly written, partly practical and oral. Three valuable prizes are offered and certificates are awarded for satisfactory work. The fall in prices and the scarcity of labour have made farmers less careful in details than formerly, and as a consequence their labourers are less skilled. Any kind of competition which revives the interest of masters and men in arts so necessary to good farming is much to be commended. If country districts held more competitions of this sort, if skill in rural arts were fostered with a tenth of the energy bestowed on foxes or football, we would hear less of rural depopulation and of agricultural depression.

THE last annual report of the Glasgow and West of Scotland Technical College shows that the high standard of the work accomplished in the institution is fully maintained. During the session 1901–2, the number of students in the various departments of the College reached 5651, of whom 596 were students studying in the day technological courses. Although the evening classes were attended by 4174 men and 220 women, the governors were unable to find room for some hundreds of students, who were perforce refused admission. In view of this serious want of accommodation, we are glad to learn that contracts, amounting to about 130,000*l.*, have been entered into for the erection of the first section of the proposed new buildings. The section will comprise about seventy-two per cent. of the whole structure, and fully three years will be occupied in its erection. It is anticipated that the new buildings, as planned, exclusive of equipment, will cost about 180,000*l.*, to which amount must be added 30,000*l.* for the site. The building fund, as shown by the list of donations given in an appendix to the report, now stands at 175,000*l.*, to which the Scottish Association of Master Bakers has contributed nearly 2500*l.*, the Glasgow Building Trades' Exchange about 650*l.* and the Trades' House and Incorporations of Glasgow an amount approaching 2000*l.* Nor is this the only evidence of the keen interest taken in higher education by Scottish manufacturers and merchants, for the report contains long lists of firms who have either given facilities for parties of students to visit works or have supplied the College with gifts of apparatus, specimens or laboratory material. That the claims of pure science have not been overshadowed by the pressing needs of the technological studies is shown by the gift of 5000*l.* from Mrs. John Elder for the provision of lectures on descriptive astronomy. There is evidently a great future in store for this deserving Glasgow institution.

SCIENTIFIC SERIAL.

Journal of Botany, October.—From the collection of plants made by Mr. T. Kässner chiefly along the railway from Mombasa, in British East Africa, Mr. Spencer Moore selects for description the more interesting species of the Compositæ and Acanthaceæ, and proposes seven new species.—Mr. W. E. Nicholson refers some miniature mosses gathered near Crowborough, Sussex, to *Ephemerum stellatum*, a species first recorded by Monsieur Philibert for specimens collected at Bruailles, in France.—A note on the genus Sematophyllum signifies Mrs. E. G. Britton's approval of the revival of that genus of mosses by Dr. Braithwaite.—Mr. G. C. Druce gives a brief account of the plant establishments on the shingle near Dungeness, and a list of Kentish plants which adds a few new localities to those recorded in Hanbury and Marshall's "Flora of Kent."—Mr. S. T. Dunn, by an inductive method of argument, deduces that only one species of the British representatives of the deadnettles, *Lamium Galeobdolon*, has maintained its original habitat and may be considered naturally indigenous.—A list of West Lancashire plants, by Messrs. J. A. Wheldon and A. Wilson, provides new county records and localities.

SOCIETIES AND ACADEMIES.

LONDON.

Entomological Society, October 1.—The Rev. Canon Fowler, president, in the chair.—Mr. H. St. J. Donisthorpe exhibited specimens of *Dibolia cynoglossi*, taken by him near Pevensey on August 11 last. He said that the beetle, which was figured by Curtis, had not been recorded as British since 1866.—Mr. O. E. Janson exhibited a fine hermaphrodite specimen of *Dryas paphia*, taken in the New Forest by Mr. Herbert Charles on July 28 and recorded in the *Entomologist*, also a melanic specimen of *Papilio demoleus* from Ceylon, in which all the usual marginal and submarginal yellow markings were absent and the discal markings much obscured; on the underside the yellow markings were entirely wanting.—Mr. C. P. Pickett exhibited a ♂ *Callimorpha dominula* with the hind-wings suffused with black and an extra black spot in the centre, the white spot on the fore-wings being absent, and a very large ♀ of the same species, both bred from larvæ found at Walmer at the end of March; also three aberrant specimens of *Triphaena fimbria* bred from larvæ taken at Wood Street during the same month.—Mr. C. O. Waterhouse exhibited specimens of a wasp, *Zethus chalybeus*, and a neuropteron, *Mantispa semihyalina*, received with a collection of Hymenoptera from Rio Janeiro, suggesting a curious case of mimicry.—Mr. F. B. Jennings exhibited specimens of *Hister merdarius*, from Broxbourne, Herts, part of a large colony of this usually scarce species found with *Hister 12-striabus* and other beetles inhabiting a heap of a chemical substance, probably gas-lime, in which also many larvæ, presumably of *Hister merdarius*, and burrows were observed. The soil was warm and moist, and this, and the presence of a quantity of vegetable refuse thrown on the heap, was no doubt the attraction to the Histers to settle there.—Mr. A. J. Chitty exhibited a specimen of *Metoecus paradoxus* with a part of the cells of a nest of *Vespa vulgaris*, in which place the beetle is invariably found. The beetle in the cell tucks in his head, only displaying on the surface the thorax, which is coloured similarly to the face of the wasp. This peculiarity suggests a case of mimicry, and Prof. Poulton said that it fitted in with the case of some other bees and wasps.—Mr. H. Rowland-Brown exhibited on behalf of Mr. G. F. Leigh, of Durban, a ♀ and ♂ specimen of a rare noctuid, *Musgravia Leighi*, Hampson, discovered by him in Natal, and read remarks upon the life-history of the species, communicated by the captor.—Mr. Stanley W. Kemp exhibited two additions to the British list of Coleoptera, *Bembidium argentiolum*, from Lough Neagh, Armagh, and *Laemostenus complanatus*, from the neighbourhood of Dublin, taken in June.—Mr. W. J. Kaye exhibited examples of *Heliconius Lindigii*, *Heliconius antiochus* and *Morpho achilles* from British Guiana with notches taken out of the hind-wings, presumably by birds, to illustrate that these distasteful or warning-coloured species are subject to attack, this helping to show that experimental tasting as propounded by the Müllerian theory of mimicry does exist and go on.—Prof. L. C. Miall, F.R.S., communicated a paper by Mr. T. H. Taylor entitled "The Tracheal System of Simulium."—Prof. Auguste Forel communicated a paper entitled "Descriptions of some Ants from the Rocky Mountains of Canada (Alberta and British Columbia) collected by Edward Whymper."—Dr. T. A. Chapman read a paper entitled "On *Heterogynis paradoxa*."

Royal Microscopical Society, October 15.—Dr. H. Woodward, F.R.S., in the chair.—Prof. T. G. Bonney, F.R.S., gave a demonstration on rock changes in nature's laboratory.

PARIS.

Academy of Sciences, October 20.—M. Bouquet de Grye in the chair.—Studies on earth, by M. Th Schloesing. In a previous paper the author has shown that the distribution of the ferric oxide varies with the size of the earth particles. In the present paper a similar result is obtained for the organic matter. The earth was separated into particles of varying fineness by levigation and the amount of organic matter determined in each, the percentage varying from 0·15 in the coarsest particles to 7·8 in the finest. A hypothesis is developed to explain these results, which it is proposed to submit to experimental verification.—On the mode of action of carbonic acid in experimental parthenogenesis, by M. Yves Delage. It has been shown that the addition of carbonic acid communicates to sea water the property of developing parthenogenetically the eggs of Asterias. Its effect is now considered from the points of view of its acidity, anæsthetic action, asphyxiating power and effect on osmotic pressure, and the conclusion is drawn that parthenogenetic agents act as temporary poisons. Carbonic acid is a perfect agent because it completely poisons the eggs, but its action is absolutely temporary, and after its elimination the protoplasm is unchanged.—On some parasitic protozoa in *Damonia Reevesii*, by MM. A. Laveran and F. Mesnil.—On the problem of the brachistochrone, by M. Haton de la Goupillière.—Remarks by M. R. Zeiller on his note in *Palaeontologia Indica* entitled

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